

## CLIMATE AND THE AGED

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An English traveller, returning home from the United States, told his friends that he had seen no old people in this country; and added that he supposed they had all died chasing the dollar! Possibly there is a gesture of truth in his supposition, but on the other hand elderly Americans do not allow themselves to appear aged, especially the women. And they are not "sans teeth, sans eyes, sans taste, sans everything."

My theme is to touch on climate and the middle-aged and aged. Osler has stated that: "The starting point of all treatment is in the knowledge of the natural history of the disease." Age has been termed an atrophy. Cumming points out the withering of the capillaries, the attenuated blood, the enfeebled respiration and lessened oxidation, the failing of the excretory organs, and the loss of elasticity of the arterial system. In consequence of such atrophies, which include the skin, we have faulty assimilation, imperfect oxidation, and diminished power of resisting cold. Cumming claims that proper climate promotes comfort.

As a preliminary to my paper it will be necessary to dwell for a moment on the meaning of climate.

The word climate is derived from a Greek word '*klima*' which means an incline or slanting position. The term was first employed to indicate a region considered with respect to its inclination towards the pole. Later it denoted the result of the oblique sun rays on the earth. We employ the word, weather, to denote the atmospheric conditions of a limited time, whereas climate is now employed to cover the atmospheric conditions recorded over a long period of time.

Climates may be marine, continental and mountain. Variations in climate are almost entirely due to the fact

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that the axis of the earth is inclined at an angle of about 24 degrees to the plane of its orbit. At the vernal and autumnal equinoxes each hemisphere has exactly the same amount of daylight and darkness. After the vernal equinox, on June 21, the northern hemisphere gains in temperature, but the greatest degree of heat is not reached for some four weeks. The atmosphere is heated more by radiation from the earth's surface than by the sun passing through it, and it takes several weeks of summer for the land and water to obtain their maximum heat and to radiate it back to the atmosphere. It is therefore when the sun is departing southward again that the hottest days of summer are experienced.

On September 21, the autumnal equinox occurs, and on December 21 the sun is at its furthest journey south. This is termed the winter solstice from the fact that the sun appears to stand still and not journey in either direction. In the northern hemisphere the sun rays reach the earth at an inclination passing through the greatest thickness of air and the hours of sunshine are short. The maximum cold we experience comes about four weeks after the winter solstice when an increasing amount of heat arrives from the sun and the amount received by the earth equals the amount lost by radiation.

Factors which are also important in determining climate, are land and water. Water takes up heat more slowly and gives it up more slowly than any other substance. The land takes up heat rapidly, in comparison, and gives up heat rapidly. The vast tract of land which constitutes our continent explains the extremes we experience in temperatures. It is considered that the extreme range of annual temperature results in the development of a strong race. It has been found by Huntington that the totality of human annual energy was greater for the northern than for the southern states.

Marine and ocean climates are known to be more equable, the large bodies of water equalize temperature, moisture and winds. Coast climate is less equable than in-

land, being disturbed by the heat radiation from land just noted. Inland climates are usually drier than coast, but vary more in temperature. In higher altitudes there is lessened proteid metabolism, but increase in activity of circulation and respiration.

Age is important in determining the suitability of climates. The young appear to thrive best in colder climates or climates having variations of temperature, and do not thrive in tropical climates.

Old people on the other hand suffer from temperature extremes and do better in warm than in cold climates. Their vitality being lower, cold weather depresses, whereas moderate warmth stimulates (*Americana*).

Perhaps I was selected to speak to you tonight on 'Climate and the Aged' because I live in Colorado, a state of moderate and high altitudes, to which physicians do not direct their aged patients. Possibly the reason was that I would not be partisan to one, more than to the other, of the states—California and Florida—to which such patients are apt to be directed.

However, I have collected a few facts, connected with a recent expedition of the aged to Colorado, which make me feel that at certain periods of the year altitudes may not be forbidden.

Two weeks ago the G.A.R. held a reunion in Denver which has an altitude of nearly a mile above sea level. Of some 13,700 veterans, drawing pensions, 11,000 attended the meeting. The average age of those in attendance was 82. Of the 11,000 attending 8,000 marched ten to twelve blocks. Some of the extreme ages of members attending are of interest. One member was 103 years of age, two were 97, one was 96. The youngest men, of which there were ten, were 79. At a similar reunion in Boston a few years ago there occurred five deaths, out of 16,000 attending veterans. During the last year there were 6,200 deaths among the membership. At the Denver meeting a large number motored up Lookout Mountain,

some 9,600 feet, and a large number came to Colorado Springs to motor up Pike's Peak 14,000 feet. During this reunion a few men were taken ill, but as far as I have been able to determine possibly only one died in Colorado.

My informant from Pennsylvania, aged 83, was returning home, and was going to tell his medical friends that they knew nothing about climate and that their anticipations of disaster which would attend this reunion were incorrect!

In my anxiety to present you something of value in regard to climate and the aged I consulted two of my valued friends in the American Climatological and Clinical Society—Henry Sewall and Carroll Edson. Sewall was of the opinion that the matter depended largely on what Claude Bernard has described as the 'internal environment.' Edson was kind enough to loan me a copy of *Verhandlungen der klimatologischen Tagung* in Davos, 1925. It is evident from this volume that the questions of climate are more thoroughly studied in Europe than they are in this country, yet positive facts which have been determined appear to be scant. Both Sewall and Edson feel that there is need for much scientific research in the matter of climate. Colorado physicians have found that cardio-renal patients, who are nearing the threshold of a break, may prolong their lives and live in greater comfort in such climates as those of S. California, Florida or Honolulu. Seeing many of these aged people, when on a visit to San Diego a few years ago, I asked a medical friend how long they survived there. The answer came that many died, but they still kept walking around!

Claude Bernard about 1870 emphasized the physico-chemical conditions of what he termed the inner environment (*milieu interieur*).

"In the outer cosmic environment, variations of temperature create the seasons which are characterized only by variations in the behaviour of animal and vegetable life on the surface of the earth. These variations take place

only because the inner environment or organic atmosphere of plants and certain animals remains in equilibrium with the outer atmosphere. The chemical composition of the cosmic or outer environment is constant and simple. The chemical conditions of the inner or organic environment are much more complex. The same individual is unlike himself at some periods in his evolution: this leads to differences connected with age. The human machine is the more perfect the better it defends itself from penetration by the influences of the outer environment; as the organism grows old and enfeebled, it becomes more sensitive to the outer influences of cold, heat, humidity, and in general to all other climatic influences."

"Physiologists and physicians must never forget that a living being is an organism with its own individuality."

"Habit is another condition potent in changing organisms."

In spite of our great advances in blood chemistry we probably do not yet fully understand this 'inner environment.'

Claude Bernard did not believe, in general, in the value of statistics. He wrote: "But physicians have nothing to do with what is called the Law of Large Numbers, a law which according to a great mathematician's expression, is always true in general and false in particular."

This doctrine is especially encouraging to one who is unable to present you with statistics in regard to climate and the aged.

Possibly no greater medical mind than that of Benjamin Franklin has originated on this continent. Franklin wrote, "he is the best doctor who knows the worthlessness of the most medicines."

To Franklin we owe the idea of the contagion of colds, the doctrine of fresh air, the great value of the air bath, and bi-focal lenses. Air bathing is too much neglected.

From Leonard Hill's writings the following knowledge is culled:

While infant mortality has been halved in the last few decades nothing has been done to extend the expectation of life of late middle age in our manufacturing cities.

The respiratory mucous membrane is, in outdoor life, far more thoroughly irrigated with arterial blood and washed with secretion and thus defended from infection. The high cooling power of air out of doors has to be made good by a greater flow of arterial blood through the parts of the face and the mucous membrane of the nose and its sinuses, and this surface is kept taut and the air-way free.

Congestion of these parts in stagnant warm atmosphere causes stuffy feelings and headaches. The want of adequate circulation and lymph flow and the evaporation from the respiratory mucous membrane must be conducive to catarrhal disease and phthisis. Middle-aged cotton spinners have a high death rate from respiratory diseases.

The native students of Singapore have a daily metabolism not equal to half that of an English student.

In regard to the benefits to be derived from sunlight, Hill states that the longest ultra-violet rays, and visible rays, penetrate to the cutaneous blood and warm it—even heating it to 47° C. The red rays penetrate deeper and reaching the joints and muscles warm these—hence the possibility of value in controlled sun bathing to those suffering from arthritis.

Window glass, clothing and smoke pollution screen off almost all ultra-violet radiation from our citizens in winter.

The sky shine gives much more ultra violet radiation than the direct sun (Dorno).

King Brown divides climates into: General Climate, Local Climate and Private Climate. The local climate of cities is handicapped by the collection of buildings interfering with free circulation of the air. This results in a

general lowering of the vitality. Atmospheric pollution of cities due to smoke and dust is also a serious drawback to health. Pure carbon is not serious, but smoke contains tar and sulphur acids, which are. Soot falling per square mile in Glasgow is 820 tons, Leeds—220, London—259 per square mile per annum.

L. Williams has likened a bracing climate, such as we have in Colorado, to champagne and a relaxing climate like that of southern states, to nepenthe. The latter he states spoils the appetite and renders one lethargic, results which are good for the aged.

Roddie and others have found that in the tropics the blood pressure of northern whites is from 10 to 15 mm. lower than in temperate climes. Mukherjee has determined that the basal metabolism is distinctly lower in the tropics than in Europe.

Books on medical climatology were non-existent when Solly in 1897 first published his work and few have appeared in recent years.

Many loose statements are found in the literature regarding the virtues of climates, and as a professor once remarked, "those who generalize tell general lies."

Madison Taylor stresses the fact that the mature judgment and specialized capacities of men from 50 to 60 years of age demand preservation. Many of these are overtired and overworked and they need two breaks a year from routine. If possible they should be sent northwards to the mountains or coasts in summer and southwards to the semi-tropical climates in winter. Such men and women of middle age rebound slower from fatigue and often present evidence of pre-senility. The brain circulation becomes defective resulting in gloom, early waking and a sense of gathering misfortunes. Disraeli described the three ages of man, "youth a blunder, manhood a struggle, and old age regret."

Taylor quotes Franklin as saying "drive your business, don't let your business drive you." One must teach optim

ism to the middle aged and when possible give them the joy of sunny climes in winter. The optimism of Browning's may be of help to some.

"Grow old along with me, the best is yet to be  
The last of life for which the first was made."

And Cicero's 'De Senectute' is encouraging to the gloom of age, pointing out that it should be considered a joy to have lost the appetites of youth.

Some family strains appear to be endowed with a tendency to longevity, in other families there would seem to be an inheritance leading to such disease as Bright's, from which many of the members will die in middle age. In England Henry Jenkins died, in 1670, at the reputed age of 157. Many descendants have been traced and there has been a tendency in this family to reach to one hundred years.

Buffon wrote that "old age is only a prejudice, but for our arithmetic we would not know it; animals do not know it, it is only by our arithmetic that we judge otherwise."

The family pedigree should be studied and the southern climes should especially be prescribed for those who have an ancestry of short lived members.

Walter James writes that the expectation of life in women past 50 is greater than that of men, although many husbands frequently predict for their wives early death from pneumonias, as a result of their scant clothing. It is just such scant clothing that man needs introduced. Nothing can be more detrimental to health than the climate which men carry beneath their unhealthy garments. Many college students and schoolboys have already discarded hats, and we can at least hope that collars and coats will next disappear.

As James points out scant clothing leads to a training of the vaso-motor system and this results in speed and precision in the distribution and regulation of the body's blood supply and the prevention of local congestions.



James also states that conditions such as mal-adjustment to surroundings, including climate, dress, work and play, may be etiological factors in the development of arteriosclerosis, Bright's and other diseases. He quotes Bacon that "to be free minded and cheerfully disposed at times of meat, of sleep and of exercise, is one of the best precepts of long lasting."

It is natural that in searching the literature on climate in relation to the aged one should find valuable articles written by physicians in Southern California and in Florida.

Remondino, 38 years ago, read an excellent and comprehensive paper on "Longevity and Climate" before the California State Medical Society.

He quoted Hufeland as saying that "The nearer and truer we were to Mother Earth, and closer our intercourse with Nature, the closer we approach the source of eternal youth and health."

Remondino tells us that in China centenarism is considered a natural condition, ninety to one hundred years being the tenth division of the life of man, and known as "Age's Extremity."

He dwells on the fall of temperature of the atmosphere as being detrimental to the aged, and reminds us that King David in his old age was kept alive by the animal heat imparted to his body by sleeping with a Sunamite maiden (Homeopathy). The climate features of Southern California which benefit the aged are well described. The latitude gives warmth and the sea yields the tempering winds. The soil is warm and dry, the sun bright and warming, the weather clear and the temperature moderate. There are no extremes of heat and cold and there is nothing to interfere with the exercise of old people. Remondino points to the actual results and the cases of longevity. Bancroft, the "Historian of the Coast," noted that the early explorers were charmed by the beauty of the natives. The essayist finds much in common between

beauty and longevity. "The unwrinkled countenance, clear complexion and bright eye, the firm contour of limb and body, the active smooth and healthy skin are as essential to attain, and enjoy, old age as they are to the perfection of beauty."

Helen of Troy, Lais, Aspasia are mentioned as originating in island climates. Scopas found his ideal Venus on the island of Equina and the modern sculptor Canova found his ideal goddess in the island of Corsica. Lady Hamilton we remember also originated in an island climate.

Hufeland further writes: "Uniformity in the state of the atmosphere particularly in regard to heat, cold, gravity and lightness, contributes in a very considerable degree to the duration of life. Islands and peninsulas have been at all times the cradle of old age. In islands mankind always lives longer than in continents lying under the same degree of latitude. Thus men live longer in the islands of the Archipelago than in the neighbouring countries of Asia; in Cyprus longer than in Syria; in Formosa and Japan longer than in China; and in England and Denmark longer than in Germany."

Hufeland states that there are fewer aged people in Switzerland than in Scotland because the great and sudden temperature changes and the cold earth of Switzerland are unfavorable for the aged. Day is quoted by Remondino as noting that twice as many people past sixty died in December as in July and that the cold months, December, January, February and March combined, yielded half the deaths for the whole year.

Prof. S. D. Gross asked "Where is the paradise on earth where man may reach his three score years and ten, as promised, and do so without pain or suffering?" Remondino answered—Southern California.

Florida was known to the Spaniards in 1502. In 1513 Ponce de Leon, a Spanish poet, mystic and theologian—who had accompanied Columbus on his second voyage—

received a grant to discover and settle Bimini, which was a fabulous island believed to contain a marvelous fountain or spring, whose waters would restore old men to youth. De Leon arrived on the coast a day named in the calendar Pascua Florida, and it is probable that this determined the name of the state. He returned to Spain believing the peninsula to be an island. It may well be that his classical learning had warned him to beware of the fate of Tithonus. This mythical person was the son of Eos—the morning—who asked Zeus that the beautiful Tithonus might be allowed to live forever. The request was granted, but Eos forgot to ask for immortal youth. As a result of this neglect, Tithonus grew into a hideous old man, and his voice “flowed on unceasingly.” Fortunately Tithonus was later changed into a grasshopper, so that he is not responsible for the garrulity of the cricket.

Florida physicians do not claim that Ponce de Leon found the fountain of perpetual youth, but they do rightly claim the advantages of residence in their state, especially in winter, for the aging residents of the northern states.

Randall writes a most complete paper concerning “Factors of Longevity in the Semi-tropics.” He studied the residence of 1,280 men who lived to upwards of 100, and found that all except 65, lived in semi-tropical zones and were lacto-vegetarians. The reports of the United States Public Health Service are quoted, which relate that 48 per cent. of the deaths in people over 60 in the 40th parallel are due to pneumonia and 26 per cent. of all deaths at all ages in this zone are from respiratory diseases. In the semi-tropical zone only 5 per cent. of deaths in people over 60 are due to respiratory diseases. Randall explains this by stating that the mucus surfaces are less susceptible to infections where sudden wide temperature changes do not occur, and he relates that infantile paralysis is never epidemic in Florida but that it always appears to follow a cold wet season in the north.

Randall writes that in warm-blooded animals the age of complete physical development, multiplied by five, determines the life expectancy.

A horse maturing at five years should live to twenty-five years. A man matures at eighteen and should therefore live to ninety. In the semi-tropics less food is consumed and climate determines diet.

The shortest lived people, the Esquimos, live on animal food, the longest lived people, the Japanese, consume little animal food. Randall finds that the food requirements are twenty-five per cent. less in the semi-tropics than in the northern states.

Robinson, a physician who speaks from his own experience, states that: "Habit, climate and associations conspire to destroy the northern middle-age successful business or professional man, ten years before his time. Suppose this man anywhere between the age of fifty and fifty-five had formed the habit of leaving his business for three months each winter and coming south. For a stimulating climate he has substituted a mild and soothing one. Instead of his hard working friends at home he is surrounded by a lot of men as idle as himself. Lastly he has effectually broken the habit of work." Robinson is in favor of Florida and warns that visitors to his state should not return north until May, on account of the chilly weather of April.

But all southern climes of the United States have winter days, which are damp and chilly, when artificial heat is necessary and even furs are needed.

Were I asked to name the ideal climates for the aged in this hemisphere I should answer the southern island climates, especially Honolulu. The Hawaiian has no word for weather and the climate is never oppressively hot. The mean annual temperature is 74 degs. F. The difference between winter and summer temperatures is only a matter of 7 degs. F. The mean annual relative humidity is 72 per cent. The average rainfall 26 inches.

Compare this climate for a moment with that of a state such as Michigan.

In Michigan the temperature can vary from minus 35 degs. F. to 108 degs. F., although the relative humidity and rainfall average the same as in Honolulu.

As far as I can determine there is little difference in the matter of longevity in the different states of the union.

When all has been said regarding the advantages of southern climes for the middle-aged and aged, the fact remains that of the few millions of these people it is not a very high percentage who can avail themselves of winter change. The problem for the majority is how to obtain climatic advantages conducive to longevity without migration. In cities the local climate must be improved by means of proper building regulations and proper control of dust and smoke. Both in the country and in the city the personal climate must be better prescribed. The diversion of hobbies and the relaxation which comes with pursuits which do not pertain to business. Diet can be controlled. Hippocrates well said "*Si homo parum edit et parum bibit, nullum morbum hoc inducit.*" Environment is to a great degree controllable. My own experience leads me to believe that old people in general are better off in their own homes and associating with their life long friends. Many middle-aged and the aged mid-west farmers have tried to take root in California and many have been successful. On the other hand there are those whose only diversion is to pitch horseshoes and they are not invariably happy in their new surroundings. Loomis, however, before the American Climatological Association in 1888, did not believe that old people should stay home. Loomis stated that the aged stood travel and change well, resulting in fresh impulse and mature life.

In every state the physician can do much to promote longevity. It has been written that there is a great difference between a good doctor and a bad doctor, but very little difference between a good doctor and no doctor at

all. There is an important field for the family physician in advising and guiding his aging patients, in studying their habits and idiosyncrasies and arranging their environment and personal climate.

Women who are aging can obtain great happiness in their domestic spheres tending potted plants in their own homes while their richer sisters may be rioting in the flower life of the southern states. Aging men are apt to give a more difficult problem.

The extensive question of climate in relation to the diseases of middle-aged and of aged patients cannot be gone into in detail at this time.

The aged with a tendency to rheumatic conditions appear to derive benefit in winter from a sojourn in Arizona where dry warmth is usual and sun baths can be employed.

Practitioners in high altitudes, such as Davos in Switzerland, find that nephritic patients do badly. On the other hand Dickinson tells us that in the equatorial districts of Ceylon, Japan, India and China there is a large proportion of renal disease.

As Edson states, research is needed in climatic physiology, in meteorologic physiology, and in climatotherapy. He adds that the change of climate for people with damaged and degenerating organs is a difficult problem. Of the benefits to be expected from climate in diseases of the heart we know very little, in diseases of the kidneys we know less, and in arterio-sclerosis, we know nothing.